REMARKS

The Applicants request reconsideration of the rejection.

Claims 7-13 are pending.

The Applicants request acknowledgement of the claim for priority in this case. The certified priority document (JP 10-372807) was filed in the parent case, U.S. Serial No. 09/469,627, filed December 22, 1999 (now U.S. Patent No. 6,483,004).

Claims 7-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bradley U.S. Patent No. 5,849,201 (Bradley) in view of Brierley et al U.S. Patent No. 5,640,703 (Brierley), Pierce et al U.S. Patent No. 5,960,368 (Pierce), and Deguitre et al U.S. Patent No. 5,948,259 (Deguitre).

As advanced in the remarks accompanying the Reply dated June 9, 2003, a key feature of the invention is the simultaneous presence of hydrogen peroxide and ozone in the radioactive liquid waste under treatment by the claimed treating apparatus. In the language of claim 7, the treating apparatus is limited by "a means for charging ozone to said radioactive liquid wastes containing aqueous hydrogen peroxide." Thus, the Applicants submit that the rejection fails because Bradley, cited as disclosing this feature, nevertheless does not teach a means for charging ozone to a radioactive liquid waste containing aqueous hydrogen peroxide.

The importance of adding the ozone to the radioactive liquid waste which contains aqueous hydrogen peroxide is that the solubility of ozone into the radioactive liquid waste is increased under the effect of the extremely high solubility of hydrogen peroxide. Due to the effect of increasing the amount of ozone in the radioactive liquid waste, together with the effect of hydrogen peroxide, the amount of OH radicals formed in the radioactive liquid waste is increased, thereby increasing the decomposition rate of organic substances, including surface active agents, contained in the radioactive liquid waste. Therefore, concentration of organic substances in the radioactive liquid waste is lowered in a shorter period of time, compared with the prior art, and the occurrence of secondary waste is suppressed.

In addressing this argument, the Examiner refers to the Bradley patent at column 12, lines 15-19 and 50-52 as disclosing the simultaneous presence of hydrogen peroxide and ozone, deducing that Bradley therefore discloses a "means for charging ozone to said radioactive liquid waste containing aqueous hydrogen peroxide." However, a careful reading of the passages noted by the Examiner indicates otherwise.

In column 12, lines 15-19, Bradley teaches that metals which act as catalysts have been found to be surprisingly and unexpectedly effective for oxidizing polycyclic aromatic

hydrocarbons (PAHs), particularly when used "in conjunction with" surfactants and oxidants, such as hydrogen peroxide, and ozone. Thus, the passage teaches the person of ordinary skill to combine catalytic metals "in conjunction with" surfactants and oxidants such as hydrogen peroxide. Further, the passage teaches the person of ordinary skill to use catalytic metals in conjunction with ozone. The passage does not teach the person of ordinary skill to use hydrogen peroxide "in conjunction with" ozone. The focus of the passage is on the use of catalytic metals.

Considered from a different direction, the person of ordinary skill reading Bradley without the benefit of the present disclosure and claims gleans from the passage a particularly advantageous use of catalytic metals when oxidizing PAHs; namely, to use the catalytic metals in conjunction with surfactants and oxidants, and in conjunction with ozone. This position is borne out in many other passages in the patent, particularly the immediately following passage, which states that, "[w]ithout these catalysts the amount of total ozone required and the contact time required to oxidize the PAHs to acceptable levels would prohibit continuous processing of massive amount of material, such as the material in a contamination landfill site. The cost of practicing the method of the present invention may be reduced through

recovery and reuse of catalysts." In other words, the importance of the passage is the use of catalytic metals to reduce the amount of ozone required and the contact time required to oxidize the PAHs.

Notably, the passage does not state that the cost of practicing the method may be reduced through the use of oxidants, such as hydrogen peroxide, "in conjunction with" ozone. Instead, the passage positively teaches that the catalytic metals bring about the required advantage. Thus, the teaching value of Bradley as a reference is in the use of catalytic metals in conjunction with surfactants and oxidants, and in conjunction with ozone. There is no positive teaching to use hydrogen peroxide and ozone at the same time, as required by the claimed invention.

Similarly, column 12, lines 50-52 of Bradley teaches that "[t]he viscosity of the mixture is optimized for interaction of ozone, oxidant and catalysts with the contaminated material." Proper parallel construction of this sentence leads the person of ordinary skill to understand that the viscosity of the mixture is optimized for interaction of ozone with the contamination material, oxidant with the contamination material, and catalysts with the contamination material. The sentence does not teach the person or ordinary skill that the viscosity of the mixture is optimized for

interaction of ozone and oxidant. In other words, because the ozone and oxidant have different functions, and particularly because the ozone functions subsequently to the functioning of the hydrogen peroxide as oxidant, the teaching value of the reference is the successive use of hydrogen peroxide and ozone, with no suggestion for their simultaneous application as claimed.

Note, further, the patent at column 8, lines 45-53 ("More particularly, the present invention broadly relates to a method for remediating material contamination with PAHs comprising, combining material contamination with PAHs... with water, catalysts, ... a first oxidant other than ozone and at least one surfactant to form a mixture; mixing these reagents and the contamination material; and adding ozone gas to the mixture to further oxidize the PAH contaminants."); column 10, lines 7-11 ("This oxidation step [e.g., with hydrogen peroxide] serves to oxidize the easily oxidizable hydrocarbons, thereby minimizing the amount of ozone required and the contact time required to further oxidize the contaminated material in the subsequent ozonation step."); column 11, lines 28-31 ("Smaller ozone bubble increase the surface area available for reaction, thereby decreasing the cost of the ozone and the cost of remediating the PAHs in the contamination material."); and column 11, lines 41-44

("Desirably the mixture and ozone are contacted in any mixing apparatus that provides rapid mixing to increase the rate of reaction and to minimize the time required to oxidize the PAHs to environmentally acceptable levels.").

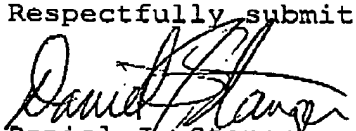
Each of these passages indicates that the purpose of the hydrogen peroxide oxidation step is to optimize the state of the PAH-laden mixture for treatment by ozonation as a subsequent step. To permit the hydrogen peroxide and ozone to coexist, according to Bradley, would be to disadvantageously extend the amount of ozone required and contact time required to perform the desired oxidation of PAHs to acceptable levels. As such, Bradley provides a clear teaching away from the invention as claimed in the present application.

The Applicants also note that each Example set forth in Bradley requires the material treated by the oxidant (e.g., hydrogen peroxide) to be then transferred to a "cylindrical ozonation column" for subsequent bubbling with ozone gas. In order to reduce the amount of ozone and time of ozone contact with the material, it logically follows that the treatment with hydrogen peroxide should be completed before transfer to the ozonation column. In other words, the logical implication is that there is no desired simultaneous treatment with hydrogen peroxide and ozone. At the very least, there is no positive teaching of such simultaneous treatment.

Because none of the secondary references teaches or fairly suggests the simultaneous application of hydrogen peroxide and ozone in the treatment of radioactive liquid waste, their combination with Bradley does not support a prima facie case of obviousness of the present claims.

In view of the foregoing remarks, the Applicants request reconsideration of the rejection and allowance of the claims.

Respectfully submitted,



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